Department of Mathematics, BGU

# Colloquium

**On** *Tuesday, January ,7 2020*

**At** *14:30 − 15:30*

**In** *Math 101-*

Tom Meyerovitch (BGU)

will talk about

## Universal models in ergodic theory and topological dynamics

Abstract: A number of of important results in modern mathematics involve an understanding the space of invariant probability measures for a homeomorphism, a flow, or group of homeomorphisms.

In this talk we will focus on finding situations where the space of invariant probability measures is essentially "as big as possible'': A topological dynamical system is $(X,S)$ \emph{universal} in the ergodic sense fi any measure preserving system $(Y,T,\mu)$, there exists an S-invariant probability measure $\nu$ so that $(X,S,\nu)$ is isomorphic to $(Y,T,\mu)$ as measure preserving systems, assuming that the entropy of (Y,T,\mu) is strictly lower than the topological entropy of $(X,S)$. Krieger's generator theorem (1970) states that the shfit map on the space bi-infinite of $N$-letter sequences is universal. Lind and Thouvenot (1977) used Kreiger's theorem to prove that Measure-preserving homeomorphisms of the torus represent all finite entropy ergodic transformations. Recent conditions

for universality of Soo-Quas (2016) and David Burguet (2019) imply that any ergodic automorphism of a compact group is universal. Together with Nishant Chandgotia we recently established a new and more general sufficient condition for ergodic universality.

Some new consequences include: - A generic homeomorphism of a compact manfiold (having dimension at least (2 can model any aperiodic measure preserving transformation. - Any aperiodic measure preserving transformation can be modeled by a homeomorphism of the 2-torus which preserves Lebesgue measure. - The space of 3-colorings of the standard Cayley graph of $\mathbb{Z}^d$, with $\mathbb{Z}^d$ acting by translations is universal.

In this talk I will discus and explain some of the older and newer results. No specfiic background in ergodic theory will be assumed.